## ABSTRACT

The present invention relates to the implementation of a digital adaptive equalizer for a T1/E1 long haul transceiver which is capable of adapting to a wide range of cable types, cable lengths, and/or other data transmission impairments, particularly when the transmission path type and/or length are unknown. The digital adaptive equalizer contains two filter blocks, i.e., an IIR filter and a FIR filter, together with a filter selector block to select a best IIR filter based on an error estimation of the received data. Only a few sets of coefficients are found to be necessary to allow proper digital equalization of a large number of cable types and/or lengths. A filter selector block selects a desired set of coefficients corresponding to the optimum IIR filter. The coefficients may be programmed into volatile memory (e.g., RAM) or non-volatile memory (e.g., Flash). Alternatively, the coefficients may be hardwired into the IIR filter. The back end of the digital adaptive equalizer contains an adaptive finite impulse response (FIR) filter. In the disclosed embodiment, the FIR filter uses a least mean square (LMS) algorithm for adaptation to the unknown or changed T1 or E1 transmission channel or medium. The adaptive FIR filter adjusts the output from the IIR filter to accurately match the inverse response of the unknown channel used to transmit the received T1/E1 signal. Equalization may be temporarily frozen if periodic patterns are detected in the received T1/E1 signal. A restored T1 or E1 signal is output from the FIR filter, and thus from the digital adaptive equalizer.